State Form 4336

DEPARTM JT OF ENVIRONMENTAL ANAGEMENT

File 3B

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: March 9, 1989

TO: Tim Heffernan
Site Investigation Section

THRU: Karyl Schmidt KS 3-9-89
Harry Atkinson HA 3/16

FROM: Billy Giles BEG
Geology Section 3/9/89

SUBJECT: Old Mishawaka Dump SI Work Plan Geologic Assessment
St. Joseph County

INTRODUCTION

The Old Mishawaka Dump site is located at 1131 Fifth Street, Mishawaka, St. Joseph County, Indiana. The site is in Section 15, T. 37 N., R. 3 E. The site is now used as a municipal waste separation center for a spring cleanup program. During excavation of a pit to burn brush, numerous drums were exposed. The drums are below the water table. Two municipal wells are located approximately 1,500 feet from the site. These wells were found to contain low levels of volatile organic compounds in 1986.

SOILS

Most of the site consists of made land; cinders and slag have been used to fill a wetland area, smoothed over, and covered with soil material.

The northern portion of the site consists of a natural soil of the Maumee Series. The Maumee is a deep, very poorly drained, nearly level and depressional soil on outwash plains. These soils are mainly on low depressional flats and along stream channels. They formed in sandy glacial outwash or stream alluvium. Maumee soils have rapid permeability and a low available water capacity. The organic matter content is high in the surface layer. Runoff is very slow or ponded. This soil has a seasonal high water table within one foot of the surface.

GEOLOGY

The bedrock beneath the site is the Devonian Ellsworth Formation. The Ellsworth is composed of gray, green and black shales. The site is located northeast of the crest of the Kankakee Arch; the bedrock dips to the northeast toward the center of the Michigan Basin.

Approximately 150 feet of unconsolidated material overlies the bedrock. Most of the unconsolidated material is glacial outwash composed of sand and gravel. Interspersed within these deposits are thin clay/glacial till units of limited areal extent. In several places in the South Bend-Mishawaka area thick clay deposits are present below the surficial sand and gravel. These till units extend to near the bedrock surface.

To the east of the site, the surficial sand and gravel is found above a moderately thick (20 - 100 feet) clay/till zone which is underlain by zone of sand and gravel. The lower sand and gravel unit ranges in thickness from 20 to 50 feet.

HYDROGEOLOGY

The Devonian shale bedrock beneath the site is a potential source of water, but is not presently being used. Movement of water in the bedrock is probably to the northeast in the direction of the regional dip.

The principal source of water is the unconsolidated Quaternary outwash materials that overlie the bedrock. These sediments are the St. Joseph Aquifer System, an outwash plain extending from eastern Elkhart County to the boundary of the St. Joseph River drainage basin in western St. Joseph County. The aquifer is composed primarily of fine to medium sand with local layers of coarse sand and gravel. Thicknesses of the aquifer system range from less than 20 feet near the southern boundary to approximately 400 feet near Elkhart. Sand and gravel thicknesses are typically 40 to 120 feet. Numerous thin (3 to 5 feet) layers of clay are interspersed in the main body of outwash.

In the vicinity of the Old Mishawaka Dump, a moderately thick deposit of clay till separates an upper deposit of sand and gravel from a deeper productive sand and gravel aquifer. The clay unit has an irregularly sloping surface that trends generally to the northwest. This clay unit is present in logs of wells east of the site, but is not evident in logs of wells west of the site.

The ground water zone beneath the clay layer is the most productive unit in the South Bend-Mishawaka area. It is extensively used by industrial and municipal wells. The clay layer creates confined hydrostatic conditions where it is present. Where the clay layer is not present, the aquifer is unconfined.

Ground water movement in the vicinity of the of the site is to the north and northwest toward the St. Joseph River. Hydraulic conductivities in the clay layer are probably in the range of 10^{-9} to 10^{-5} cm/s, which provides a moderate amount of protection for the lower sand and gravel from contamination. Within the aquifer, the sand units have hydraulic conductivities ranging from 10^{-3} to 10^{-1} cm/s and the gravel units range from 10^{-1} to 10 cm/s.

The St. Joseph River is approximately 2,000 feet northwest of the site; however, surface water movement is slow in this area and very little surface run off is likely to reach the river. The site was formerly a wetland area that has been filled. At the southern boundary of the site is an area of permanent standing water that has not been filled. A pond has been constructed just to the southwest of this standing water.

SUMMARY AND RECOMMENDATIONS

The Old Mishawaka Dump is located in a wetland that serves as a recharge area for the St. Joseph Aquifer, one of the most important aquifers in Indiana. The glacial outwash beneath the site is relatively permeable. Contaminants could easily migrate off-site or into the ground water, which is close to the surface. Movement of contaminated ground water would probably be to the north or northwest. A large number of industrial or municipal wells are near the site or between the site and the St. Joseph River. Most of these wells are

relatively shallow (50 - 100 feet) and many wells have no intervening clay barrier between the surface and the well screen.

Sampling recommendatons include both municipal well fields, the larger field adjacent to the river and the smaller field just 500 feet southeast of the site. Also any wells that can be found to the northwest between the site and the river should be sampled.

REFERENCES

Benton, Hezekiah, Jr., 1977, Soil Survey of St. Joseph County, Indiana, U.S. Department of Agriculture, Soil Conservation Service, 100 p.
Division of Water, 1987, Water Resource Availability in the St. Joseph River Basin, Indiana, Department of Natural Resources, Division of Water, 139 p.

Hunn, J.D. and Rosenshein, J.S., 1969, Geohydrology and Ground-water Potential of St. Joseph County, Indiana, U.S. Geological Survey, Bulletin No. 33, 20 p.

Peters, James G. and Renn, Danny E., 1988, Effects of Agricultural Irrigation on Water Resources in the St. Joseph River Basin, Indiana, and Implication for Aquifer Yield, U.S. Geological Survey, Water-Resources Investigations Report 37 - 4273, 35 p.

Rosenshein, J.S. and Hunn, J.D., 1962, Ground-water Resources of Northwestern Indiana. Preliminary Report: St. Joseph County, U.S. Geological Survey, Bulletin No. 15, 318 p.

BEG/lal

Attachments

State Form 4336

DEPARTMENT OF ENVIRONMENTAL MAN. MENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: February 27, 1992

TO: Greta Hawvermale, Asst. Comm. THRU: Reggie Baker RDB 2/27

FROM: Prabhakar Kasarabada, Project Manager PK
Superfund Section

SUBJECT: Gumwood Wellfield/Uniroyal (your E-Mail message)

Based on a quick review of existing information, the following points are noted.

1. The incomplete RI investigations at Douglas Road Landfill (DRL) Superfund site revealed that the ground water flow direction with reference to the site is toward South-Southwest of the site (marked with arrow).

2. The Gumwood Wellfield is upgradient of the site.

3. A previous study conducted by IDEM, Tech Support staff has indicated that the pumping of the wellfield would not influence the site unless and until a ground water flow reversal conditions occur (see the attached letter).

4. Fifth and Virgil Streets are located south of St. Joseph River whereas the DRL site and Gumwood Wellfield are north of the St. Joseph River. This indicates that the sources of vinyl chloride contamination might be isolated pockets. To relate this chemical to DRL would require more logical, technical evidence and further investigation of subsurface geological conditions within the St. Joseph aquifer system.

   Regarding the buried barrels of vinyl chloride at the Fifth Street site which led to closure of well #11 at Baker Park, appears to have a connection and needs a detailed investigation. The Michiana Area Council of Governments Map St. Joseph County, indicates known contaminant areas in the vicinity of Fifth Street, Virgil Street and Baker Park well #11 area.

5. A more technical and detailed information is available with the Drinking Water Branch of Water Management Division. Their staff conducted a public hearing on this issue a month ago (contact # of Bob Hilton group 233-4240).

This is for your information. If you have any questions, please contact me.

PK/cd

Attachment